

REMARKS

Claims 1-15, 19, 30, 32, 33, 41, 42 and 66-70 are pending in the present application. Reconsideration of the application is respectfully requested.

In the Office Action, claims 1-5, 14, 15, 19 and 30 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Tanaka (U.S. Patent No. 6,355,492). Claims 6-13 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Tanaka in view of Yamauchi (U.S. Patent No. 6,284,587). Claims 32, 33, 41, 42 and 66-69 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Tanaka. Claim 70 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Tanaka in view of Kiyotoshi (U.S. Patent No. 6,091,099). Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirk v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. "Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Skinner*, at 1789, citing *Oelrich*. Where

anticipation is found through inherency, the Office's burden of establishing *prima facie* anticipation includes the burden of providing "...some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art." *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior

art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991; *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Anticipation Rejections

Tanaka does not anticipate claims 1-5, 14, 15, 19 and 30. Tanaka is directed to a method of forming a capacitor and the resulting structure. Abstract; Col. 1, ll. 10-14. Tanaka specifically notes that the use of metals, such as ruthenium (Ru), as a capacitor plate may cause problems when it is oxidized. Col. 2, ll. 12-27. To that end, Tanaka is directed to a method of forming a metal oxide layer by oxidizing a surface of a metal layer on the basis of a diffusion controlled reaction. Col. 2, ll. 44-46. In Example 1, Tanaka discloses forming a metal oxide layer by heat treating a previously formed metal layer. Col. 6, ll. 20-43. Ruthenium oxide powder was reduced in a nitrogen environment to obtain Ru single crystal powder. The Ru single crystal powder was then heated to form a metal oxide layer. Col. 6, ll. 36-43. In Example 3, Tanaka discloses forming a lower metal oxide layer 22A of ruthenium by a deposition process. Thereafter, the metal layer 22A is oxidized to form the metal oxide layer 22B. Col. 9, ll. 1-45; Figures 4A-4B

Claim 1 is fundamentally different from the methods disclosed in Tanaka. Claim 1 requires providing a layer containing ruthenium oxide and converting at least a portion of the ruthenium oxide in the ruthenium oxide layer to ruthenium to produce a ruthenium-containing layer having a rough surface. Independent claims 14, 15 and 30 contain similar limitations. Tanaka does not disclose or suggest the methodology defined by the pending claims.

Tanaka is concerned with the oxidation of a ruthenium layer when the ruthenium layer is used as an electrode of a capacitor. Col. 2, ll. 12-27. To alleviate the problems, Tanaka proposes a unique method whereby a “surface of a metal layer is oxidized on the basis of a diffusion-controlling reaction, to form a metal oxide layer, so that a dense metal oxide layer can be formed.” Col. 15, ll. 31-34 (emphasis added). Further, the metal oxide layer is formed at the interface to an insulation layer of a capacitor so that the flatness of the electrode surface is not impaired by evaporation and/or re-oxidation when the electrode is exposed to a high temperature. Col. 15, ll. 34-39.

Tanaka does not disclose or suggest converting at least a portion of a previously formed layer of ruthenium oxide to ruthenium, as recited in claim 1. In Tanaka, the reverse process is happening. The layer of ruthenium 22A is oxidized so as to form a ruthenium oxide layer 22B. See Figure 4B. Moreover, as understood by the undersigned, the process described in Tanaka is an effort to insure that “the flatness of the electrode surface is not at all impaired by evaporation and/or re-oxidation....” Col. 15, ll. 34-37 (emphasis added). In contrast, claim 1 recites that the method claimed therein results in “a ruthenium-containing layer having a rough surface” (emphasis added).

Accordingly, it is respectfully submitted that the anticipation rejections of claims 1-5, 14, 15, 19 and 30 be withdrawn.

Section 103 Rejections

All of the § 103 rejections are based upon Tanaka as the primary reference. Applicants respectfully submit that the § 103 rejections are improper. First, as noted above, Tanaka fails to disclose many fundamental aspects of the presently claimed invention. Thus, even if the references were combined in the manner suggested by the Examiner, such a combination of prior art would not contain all the limitations set forth in the claims. The citations to the various

secondary references cannot cure the fundamental deficiencies in Tanaka, as noted above. Accordingly, any such obviousness rejection would be legally improper for at least this reason.

Moreover, it appears that Tanaka teaches away from the presently claimed invention in at least three respects. First, in Tanaka, as it relates to the layers of material, *i.e.*, not the powders, Tanaka teaches oxidizing a surface of a ruthenium layer to form a metal oxide layer. It is not understood why one skilled in the art, when reading the express disclosure of Tanaka, would be motivated to form a layer of ruthenium oxide and convert at least a portion of the ruthenium oxide in that layer to ruthenium. That is directly contrary to what Tanaka teaches. Simply put, why would one skilled in the art read Tanaka and be motivated to act contrary to the express teaching of that patent.

Second, it is unclear that the device in Tanaka could function for its intended purpose as an electrode for a capacitor if, as the Examiner suggests, the metal layer 22A in Figure 4B was actually a metal oxide layer, and the metal oxide layer 22B was actually a metal layer. It would appear that such a “modified structure” might not work as an electrode for a capacitor.

Third, it appears that Tanaka is directed to a process that is intended to maintain or not degrade (Tanaka uses the phrase “not impair”) the flatness of the gate electrode. Col. 15, ll. 35-37. Again, there does not appear to be any logical reason why one skilled in the art would be motivated to modify the teachings of Tanaka (a capacitor-electrode with a surface wherein the flatness is “not impaired”) for a ruthenium-containing layer that has a rough surface, as recited in claim 1. Similar arguments apply to other claims wherein a rough or textured surface is recited.

A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and

common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that the invention defined by independent claim 1 or the other independent claims in this application would have been obvious in view of Tanaka and the prior art of record constitutes an impermissible use of hindsight using Applicants' disclosure as a roadmap. "Our case law makes clear that the best defense against the subtle but powerful attraction of hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." *Teleflex v. KSR Intern. Co.*, 119 Fed. Appx. 282 (Fed. Cir. 2005) (unpublished) (citations omitted).

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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